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January 14, 2000

EX PARTE

Magalie R. Salas, Secretary
Federal Communications Commission
The Portals Building
445 12th Street, SW TW-A325
Washington, D.C. 20554

ET Docket No. 98-206

Dear Ms. Salas:

PanAmSat Corporation ("PanAmSat") hereby submits the enclosed reply comments on an ex parte basis.

Sincerely,

Joseph A. Godles
Attorney for PanAmSat Corporation

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 25 of the	)	ET Docket No. 98-206
Commission's Rules to Permit Operation	)	
Of NGSO FSS Systems Co-Frequency with	)	
GSO and Terrestrial Systems in the Ku-Band	)	
Frequency Range	)	

REPLY COMMENTS OF PANAMSAT CORPORATION

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TABLE OF CONTENTS

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	)	
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REPLY COMMENTS OF PANAMSAT CORPORATION

The comments filed in response to the Commission's December 6th Public Notice demonstrate that NGSO/GSO sharing has been and continues to be controversial. While all parties agree that the CPM compromise should form the basis for the Commission's domestic regulation of Ku-band NGSO systems, the parties disagree – in some cases sharply – about the scope of that regulation.

In essence, the dispute turns on whether the Commission should take a passive or an active role in assuring compliance with the CPM compromise. In the view of GSO operators and some NGSO applicants, the Commission should take an active role, implementing and enforcing the CPM compromise in a way that will ensure that NGSO operators, both individually and collectively, live up to each of the obligations they have agreed to accept. In contrast, in the view of some NGSO applicants, the Commission should take a passive role, authorizing systems without first determining whether they can operate as their proponents contend and waiting to see if disaster strikes before taking any meaningful action.

In light of the divergent views expressed in the comments, PanAmSat is submitting this reply to clarify its proposed rules and to respond to specific objections made by SkyBridge, Boeing, and Loral.

I. SUMMARY

Several core considerations should guide the Commission in its analysis of the comments and its development of NGSO licensing, technical, and service rules:

- GSO FSS systems have primary status in the Ku-band and already exist. GSO satellite operators and end users have invested vast sums in these systems, and billions of users in the United States and around the world rely upon the communications services they support.
- NGSO systems are new, untested, and tremendously complex. Their ability to meet the CPM masks and limits depends on technically intricate, and as yet unverified, design and operational considerations.
- The CPM compromise is the result of years of negotiations and studies. Each element of the compromise is essential and must be implemented and enforced in a way that assures its integrity.

Based upon these considerations, PanAmSat submitted to the Commission a series of recommendations for implementing the CPM compromise. Briefly stated, PanAmSat discussed the need for a pre-licensing demonstration by each NGSO applicant that it can comply with the Additional Operational Limits (administered by the FCC) and with the Aggregate Limits (administered by the ITU BR). In addition, PanAmSat discussed the need for a meaningful, post-licensing process to enforce compliance with the Operational Limits. Finally, PanAmSat highlighted the absence of aggregate interference limits and discussed the implications of this gap on the Commission's licensing process.

Three of the NGSO proponents - SkyBridge, Boeing, and Loral - took exception to PanAmSat's proposals.[1] These entities argued that PanAmSat's proposals are unneeded, unworkable, and overly expensive, and would require the disclosure of proprietary information. As a result, they contended, the Commission should simply accept commitments from the applicants that their systems will meet the Operational Limits and the Additional Operational Limits, but should require no supporting information to verify either of those assertions.

For the reasons discussed herein, the Commission should reject the NGSO's recommendations and exert its regulatory authority in a way that does not defer action until it is too late.

II. THE VALIDATION LIMITS

The parties generally agree that the ITU should be the primary forum for determining whether a proposed system meets the validation limits. As long as verification is part of the initial filing process, and provided that an open process is used that allows individual Administrations to confirm compliance, the FCC need not duplicate the ITU's efforts.

SkyBridge proposes in its comments that, if an NGSO applicant or licensee changes its system's characteristics after the ITU has determined that the system complies with the validation limits, the licensee would be required to notify the FCC of the changes only if they would cause the system to perform outside the envelope defined by the initial parameters.[2] PanAmSat could accept this somewhat limited notification proposal (as opposed to an across-the-board notification requirement) as long as: (1) in such cases, the NGSO then is required to demonstrate that it still complies with the validation limits and the additional operational limits; and, (2) both the notification of changes and the

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[1] These parties were responding to an earlier PanAmSat submission, which described in a more summary fashion PanAmSat's recommended implementation of the CPM compromise.

[2] SkyBridge Comments at 14.

demonstration of continued compliance be put on Public Notice for comment by potentially affected parties.

III. THE ADDITIONAL OPERATIONAL LIMITS.

For GSO operators, the Additional Operational Limits (also referred to as the Operational Masks) are a critical component of the CPM compromise and the key means for protecting GSO FSS systems. Without these limits – or if these limits are not subject to meaningful, effective enforcement – there is no compromise.

As even the NGSO proponents concede, post-licensing enforcement of the Additional Operational Limits will be elusive at best and impossible at worst. SkyBridge and Loral, for example, both agree that it will be difficult to verify by measurement whether a system is in compliance with the Additional Operational Limits.[3] Moreover, as the comments of several NGSO proponents reflect, it is possible to make a pre-licensing compliance assessment.[4]

In light of the above considerations, and taking into account the central importance of the Additional Operational Limits, PanAmSat has proposed that the Commission require each NGSO license applicant to show compliance with the Additional Operational Limits before it could be licensed. Specifically, each applicant would be required to make a demonstration, with supporting information, consisting of:

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[3] SkyBridge Comments at 17; Loral Comments at 7.

[4] Boeing Comments at 5 ("Boeing could provide prior verification that its system meets operational limits..."); Virtual Geo Comments at 4 ("Virtual Geo would support a Commission-developed rule that would require non-GSO FSS systems to demonstrate their ability to meet all of the agreed validation and operational limits prior to receipt of any authorization."); see also Lockheed Martin Comments at 8 ("the Commission must develop rules that require each applicant for a Ku-band non-GSO FSS system to demonstrate, as a prerequisite to the issuance of any authorization, that its system will in fact comply with all applicable ITU limits."). Lockheed Martin is an applicant for an NGSO system in the Commission's second Ka-band processing round. Moreover, as discussed *infra*, both SkyBridge and Loral state that they will conduct an internal simulation to determine compliance with the Additional Operational Limits.

- a set of maps illustrating the geographic distribution of the maximum $EPFD_{down}$ levels within the United States; and,

- a means for determining the time distribution of $EPFD_{down}$ levels at any specific location in the United States.

Both types of information could be produced by means of software simulations, using software supplied by the NGSO applicant.[5] The Commission could establish a domestic industry study group to recommend a detailed set of requirements for the development of Additional Operational Limits verification software. Each NGSO applicant then would develop and present its own software (or, alternatively, the NGSO applicants could agree on a common software tool) for assessing compliance with the Additional Operational Limits.

The individualized approach proposed by PanAmSat is flexible: it gives each NGSO operator a choice between modeling its system to permit a wide variety of operational parameters and bounding specific aspects of the system. The more closely the model mirrors actual anticipated operations, the easier it will be for the NGSO system to comply with limits; at the same time, such a model will contain fewer options for future variations. In either case, the Commission and GSO operators will have a reasonable basis for determining whether a particular system, with particular operational parameters, will meet the Additional Operational Limits.

A. Additional Operational Limit Maps Are a Crucial Component of a Successful Sharing Regime.

The inclusion of the map requirement was intended to serve two purposes. First, the maps will demonstrate whether an NGSO applicant will

[5] The NGSO applicant would be required to make available for public inspection and comment its software source code and all justifications and assumptions employed as part of its demonstration. Unless chosen by an NGSO applicant, the ITU BR Validation Limits software would not be used to determine compliance with the Additional Operational Limits.

comply with the Additional Operational Limits at each geographic location within the United States.

This type of pre-licensing demonstration is critical to an evaluation of whether NGSO systems can, in fact, operate within the limits.[6] Modifications and adjustments become substantially more difficult to require – both as a technical and a practical, political matter – once an NGSO system has been built and launched. Moreover, as noted above, there is as yet no way to measure an NGSO system's actual, operational compliance with the Additional Operational Limits. Hence, NGSO applicants' commitment to meet these limits once in operation is an empty promise: if there is no pre-launch assessment, there will be no assessment whatsoever.

A pre-licensing demonstration also is necessary to provide the Commission with an adequate basis for representations it must make to the ITU. As part of an NGSO satellite filing, the Commission must commit to the ITU that, when in service, each proposed NGSO system will meet the Additional Operational Limits.[7] It is difficult to envision how the Commission can make such a commitment if it lacks a reliable post-licensing measurement technique and does not require a pre-licensing demonstration of compliance.

The imposition of a pre-licensing "check," moreover, is particularly appropriate given the number of pending Ku-band NGSO systems (8) and the maximum number of systems that can be accommodated in this spectrum (3.5). The Commission has an obligation to use engineering solutions and threshold qualifications to avoid mutual exclusivity among the NGSO applicants.[8] Under these circumstances, it would be inappropriate for the Commission to license

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[6] Because the Validation Limits are inadequate to protect GSO systems, a demonstration of compliance with the Validation Limits cannot serve as a substitute for a pre-licensing demonstration of compliance with the Additional Operational Limits.

[7] CPM Report § 3.1.2.1.4(c).

[8] 47 U.S.C. § 309(j)(6)(E).

some but not all systems without first investigating whether each licensed system will be able to satisfy the CPM compromise's requirements.

In addition to making possible an evaluation of an NGSO system's ability to operate within the Additional Operational Limits, the map requirement will serve a second, related purpose: providing a much-needed tool for establishing where worst-case interference levels will occur and, as a result, making it possible for a GSO operator to determine which GSO links will require additional margin in order to achieve adequate protection.

A reliable means of predicting actual NGSO interference patterns is needed because the Additional Operational Limits will not provide protection against NGSO interference for all GSO links. There is no disagreement over this point in the ITU-R. Papers submitted by IntelSat [WP 4A(99)/371], PanAmSat [WP 4A(99)/329, CPM99/138] and France [WP 4A(99)/276] all demonstrated that the Additional Operational Limits will not protect all GSO links. In particular, as discussed in PanAmSat's comments, links in drier Rain Zones (such as in the western half of the United States) generally will not include enough margin to protect against the possible additional interference caused by some NGSO systems.

Without maps, GSO operators would have to assume that maximum $EPFD_{down}$ levels could occur anywhere, and would have to provide additional margin to all links in sensitive climatic regions in order to be sure of protecting the truly "at risk" links. This would represent a profoundly inefficient use of spectrum and would impose an unwarranted burden on GSO operators and end users. Use of the maps, in contrast, could produce a significant improvement in efficient use of the spectrum that could translate into financial savings to GSO operators and end users.

An example of the type of map proposed by PanAmSat is shown in Figure 1. This map assumes a fully loaded system, and an envelope of all scheduling algorithms. It is worth noting that, even with these maximum case assumptions, there is a significant geographic variation in the maximum $EPFD_{down}$ level, including variation in the more arid regions that require the most protection.

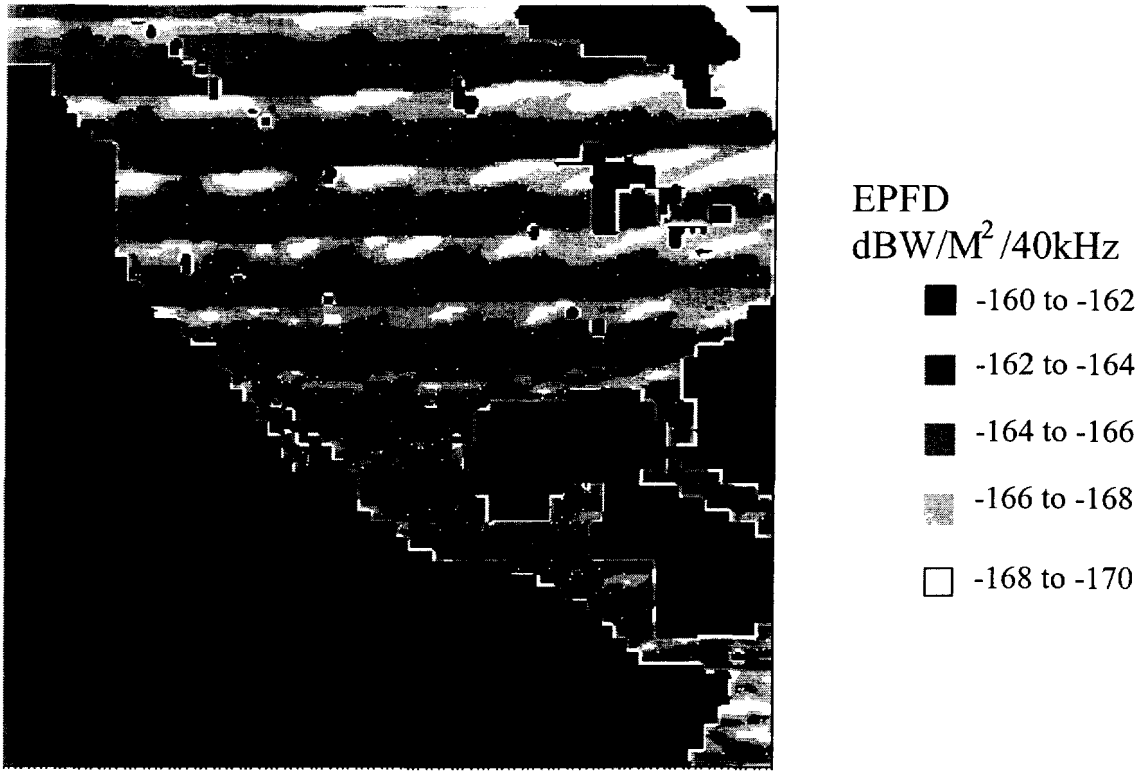

Figure 1. In-line maximum EPFD levels of F-SAT-MULTI-1B for fixed cells on the ground and for a specific Geostationary Satellite Orbit location.

The generation of the maps, moreover, should require little effort on the part of each NGSO applicant and will impose no additional restrictions on the operations of NGSO systems. The fundamental requirement for the generation of the maps is an accurate representation of the NGSO system's operation and its parameters. With that information, it is possible to develop, by means of well-accepted computer algorithms that simulate orbital mechanics and interference considerations, a computer program that can produce the requisite maps. As a

demonstration of the level of effort involved, PanAmSat is submitting a proposed draft new recommendation to ITU-R working party 4A, which describes the procedures for generating these maps.

PanAmSat recognizes that the geographic distribution of maximum $EPFD_{down}$ levels for a specific NGSO network likely will change over time due to changes in the system's scheduling algorithms and traffic loading. NGSO applicants, however, can compensate for those changes by having the maps represent the envelope of maximum $EPFD_{down}$ levels that could occur over the life of the NGSO system. As discussed above, it would be up to each individual NGSO applicant to decide on an appropriate tradeoff between flexibility and ease of demonstrating compliance.

B. Enforcement of the Additional Operational Limits Also Must Take Into Account the Time Distribution of an NGSO System.

NGSO interference levels will be different at each specific point on the earth's surface. Moreover, as time passes the instantaneous level of interference at each earth point will vary.

The Additional Operational Limits do not merely limit $EPFD_{down}$ levels at any moment in time, they also set an upper bound the level of these emissions over time. As a result, it is imperative that some means be provided to verify that those limits can be met over time.

The Time Distribution software proposed by PanAmSat would serve this function. Without a means for determining the time distribution of $EPFD_{down}$ levels at any specific location in the United States, a key component of the Additional Operational Limits will be lost.[9]

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[9] The Additional Operational Limit Maps discussed above will be "snapshots" of interference levels, indicating what the highest level of interference will be at each point. They will not, however, provide a means for assessing a system's ability to meet the time duration limits over time at each point within the United States. As a result, they are necessary but not adequate to enforce the Additional Operational Limits.

C. The Objections To PanAmSat's Proposals For Enforcing the Additional Operational Limits Should Be Rejected.

1. The Proposed Demonstration Will Not Impose An Unreasonable Burden on NGSO Applicants.

While Boeing contends that PanAmSat's proposal for NGSO interference maps would be "unduly burdensome,"[10] this claim does not withstand scrutiny.

Both SkyBridge and Loral state that they would prepare "detailed simulations of [their] constellations, employing actual operational parameters" and use these simulations to determine, prior to licensing, their ability to comply with the Additional Operational Limits.[11] These determinations then would form the basis for their proposed certifications to the Commission that they could meet the Additional Operational Limits once in service.[12]

Presumably, these NGSO licensees also would revise their simulations to reflect modified operating parameters. Absent such revised assessments, they could not in good faith satisfy their compliance commitment to the Commission or ensure they were continuing to operate consistent with ITU and FCC requirements.

Thus, while SkyBridge and Loral protest that computer simulations modeling compliance with the Additional Operational Limits should not have to be provided to the Commission, neither they nor Boeing reasonably can claim that the simulations themselves are too difficult to perform, or that the products they generate are too difficult to produce.

Moreover, Boeing's claim that much of the alleged burden will arise from the fact that "[d]isagreements are bound to arise over the parameters of the

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[10] Boeing Comments at 7.

[11] SkyBridge Comments at 17; Loral Comments at 4 (chart), 7.

software and standards to be used to determine compliance"[13] confirms – rather than refutes – the need for a pre-licensing demonstration. Uncertainty about how to measure compliance is the principal reason why the question of how to determine compliance and how to resolve disputes cannot be deferred until after NGSO systems have been launched and placed into operation. The fact that the details of verification have not been resolved should be cause for action, not a justification for inaction.

2. Changes in Loading and Switching Algorithms Will Not Render The Maps Unreliable.

SkyBridge also claims that maps showing "worst case" locations for NGSO interference would be unreliable because changes in a system's loading and switching algorithms also would change the maps and render previously-provided maps outdated.[14]

PanAmSat acknowledges that NGSO network configurations will change over time. For that reason, PanAmSat proposed that the maps should represent an envelope of $EPFD_{down}$ levels over the life of the NGSO system. NGSO systems, such as SkyBridge's, naturally will have a variation in maximum $EPFD_{down}$ levels based on latitude, distance from the nearest NGSO gateway, and elevation angle from the GSO ground station to the supporting GSO spacecraft. PanAmSat recognizes that maximum loading in conjunction with an envelope of normal switching algorithms will provide a somewhat pessimistic result. Even with this limitation, however, PanAmSat believes that having an upper bound is much more useful for determining specific protection requirements than any proposed alternative.

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[12] Id. SkyBridge also agrees that, in the event a "credible" claim of a rule violation was made, the Commission could require the NGSO licensee to provide its simulations to the Commission. Id. at 18.

[13] Boeing Comments at 5.

[14] SkyBridge Comments at 17, 18, 19; see also Loral Comments at 7.

3. Loading and Switching Information Should Not Be Deemed Proprietary.

SkyBridge also claims that loading and switching information is proprietary and, therefore, cannot be disclosed.[15] SkyBridge, however, fails to explain the basis for its conclusion that this data is entitled to protection as proprietary information.

SkyBridge's conclusion, moreover, is unwarranted. The traffic loading and switching information that PanAmSat has proposed be disclosed need not include any specific end user location, traffic pattern, carrier usage or other similarly sensitive marketing information. Switching algorithms generally are not considered unique and, even if they were, are not the kind of information that affords any marketing or technological advantage.

The only new information that might be revealed as a result of the disclosures proposed by PanAmSat would be the aggregate level of traffic that an NGSO cell might experience. Considering that the specific cell area would be public information and the marketing potential for the served population could be ascertained by other means, it is difficult to understand what could be proprietary about the aggregate traffic information.

Indeed, the Commission's rules already require satellite operators, when filing applications for space station licenses, to provide similar information to the Commission in order to enable affected parties to evaluate the potential for interference.[16] These requirements initially were developed to facilitate GSO-to-GSO interference analysis. With the advent of NGSO operations, it would be appropriate for the Commission to update its rules to require NGSO operators to provide equivalent information and, thus, make it possible for GSO operators to conduct an NGSO-to-GSO interference determination.

Similarly, during coordination discussions satellite operators routinely are required to provide comparable data to the other parties to the coordination. NGSO applicants should be bound by similar information sharing requirements.

Finally, in the unlikely event that a particular subset of the data described by PanAmSat can be shown by a preponderance of the evidence to be proprietary, the NGSO applicant submitting that data may seek confidential treatment under Section 0.459 of the Commission's rules. The possibility that some data may be proprietary, however, does not warrant eliminating an effective method for pre-licensing determinations of compliance.

4. The ITU-R Has Not Rejected PanAmSat's Proposal.

SkyBridge also claims that PanAmSat's proposal for the mandatory submission of EIRP maps was "extensively discussed and rejected" within the ITU-R process.[17] SkyBridge is incorrect.

While there was discussion of this topic in the corridors during some of the CPM meetings, there never has been a formal debate on the concept, either at the CPM or by the ITU. The only rejection of the idea of which PanAmSat is aware occurred during private discussions with SkyBridge. At that time, PanAmSat offered the concept as part of a plan that would have allowed SkyBridge to meet the EPFD limits then being proposed by the United States on a limited part of the earth's surface. SkyBridge's rejection of this proposal, however, in no way constitutes an ITU rejection of the concept of EIRP maps. Indeed, the idea of requiring such maps, when informally proposed to other administrations and INTELSAT, has been well received.

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15 SkyBridge Comments at 17, 18.
[16] 47 C.F.R § 25.114.
[17] SkyBridge Comments at 20.

On a related note, SkyBridge claims that the PanAmSat proposals are inconsistent with the CPM consensus. However, the CPM "agreed that it is essential to develop as a matter of urgency recommendations to permit administrations to check compliance with the Additional Operational Limits."[18]. PanAmSat's proposals are designed to achieve exactly this objective and, thus, are fully consistent with the CPM's express conclusions.

5. The Proposed Demonstration Will Provide Necessary Protection To GSO Operators and Users.

Boeing's claim that PanAmSat's proposed demonstration "would provide no additional protection for GSO networks or their users"[19] is simply wrong. As discussed above, there currently is no way to measure compliance with the Additional Operational Limits; as a result, if pre-licensing computer simulations are not required, these essential limits will be reduced to a paper obligation with no real effect. Moreover, the maps proposed by PanAmSat will enable GSO operators and users to plan rationally for cases of extreme NGSO interference rather than squandering scarce satellite power on all potentially affected sensitive links. These benefits clearly justify the minimal effort the obligation to run a computer simulation would require of NGSO applicants.

6. The Commission's Existing Remedies Are Not Adequate.

Boeing also contends that a pre-licensing compliance determination is unnecessary because the Commission has available to it adequate post-launch enforcement mechanisms.[20] This claim ignores the difficulties inherent in demonstrating operational compliance with the Additional Operational Limits, as well as the problem of effective enforcement inherent in any post-licensing enforcement process. Moreover, it would shift onto GSO users and operators the burden of uncertainty; under any post-launch enforcement approach, GSO

[18] CPM Report, Section 3.1.2.1.4 (c).
[19] Boeing Comments at 7.

operators and users will have to operate in an information vacuum and, in the event of NGSO interference, will have to suffer the consequences of that interference while evidence is collected, the source of the interference is isolated and, perhaps, even while the dispute is being resolved.

7. GSO/FS and NGSO/GSO Sharing Situations Are Not Comparable; As a Result, NGSO/GSO Sharing Rules Should Not Mirror GSO/FS Sharing Rules.

SkyBridge attempts to justify reliance solely upon licensee certifications of compliance on the ground that the FCC uses similar certifications to ensure GSO compliance with FS sharing rules.[21]

The GSO FSS and FS services, however, have a long history of spectrum sharing, and the technical criteria used to ensure successful sharing are well understood and time tested. As a result, in the GSO/FS context, the Commission appropriately imposes on licensees the condition that they comply with frequency tolerance and emission limitations, rather than measuring or validating compliance prior to licensing.

The situation with respect to NGSO/GSO sharing is markedly different. NGSO systems are novel and never before have been operated. Neither the EPFD limits nor the methodologies NGSO operators will use to comply with those limits have ever been demonstrated, in operation, to be achievable or adequate. Indeed, the entire CPM compromise requires, to a significant extent, a leap of faith by GSO operators and the billions of users who rely on their services. In such an unsettled context, it would not be appropriate to rely on license conditions without also performing some assessment of whether a licensee actually can satisfy those conditions.

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[20] Boeing Comments at 6.

[21] SkyBridge Comments at 18.

D. The Commission Should Not Rely on The ITU To Develop Methods for Determining Compliance With the CPM Compromise Limits and Masks.

Loral proposes that the Commission defer to the ITU on the questions of how to determine compliance with the Additional Operational Limits.[22] PanAmSat opposes this proposal.

The ITU, while important, cannot replace the Commission in determining rules and processes that serve the specific needs of the United States. These needs should include the consideration that the United States has a large percentage of its land mass within low rain zone areas and those areas are more sensitive to NGSO interference. Although PanAmSat intends to participate in the ITU's process, it cannot be preordained that the results of this process will be sufficient. Accordingly, the Commission should – as it has in other situations – augment the ITU outputs with regulatory and technical performance criteria that expand upon the ITU recommendations.[23]

Moreover, there are no published ITU recommendations addressing the subject of the Additional Operational Limits and how to determine violations of these limits. Perhaps more importantly, there also is no schedule of when those recommendations might appear. On such a crucial matter, the FCC cannot reasonably exercise its rulemaking and enforcement authority simply by deferring to an uncertain and potentially open-ended process.

For all of the above reasons, the Commission should reject certain NGSO applicants' efforts to render the Additional Operational Limits toothless and

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[22] Loral Comments at 7. Loral makes a similar recommendation with respect to the Aggregate Limits, and both Loral and SkyBridge recommend reliance on the ITU for enforcement/measurement methodologies for the Operational Limits.

[23] The creators of ITU recommendations generally concentrate on technical issues while avoiding regulatory concerns. Although the ITU Study Groups, which are responsible for creating recommendations, do have the authority to address regulatory issues, regulatory considerations

should adopt PanAmSat's recommendations for a pre-licensing demonstration of compliance.

IV. THE OPERATIONAL LIMITS

The Operational Limits will be the sole ongoing means of enforcing NGSO sharing commitments. In order to give meaning to these limits, PanAmSat urged the Commission to develop and enforce a rapid, effective process for identifying NGSO systems that are exceeding the limits and for requiring those systems to reduce their emissions immediately to the proper levels.[24]

One necessary component of such a process is ensuring that GSO operators and users have available to them the information they need to identify the source of an interfering signal and to correlate sync loss problems with specific NGSO system satellites. Boeing, however, argues that these entities should be forced to rely on generic Air Force and NASA databases of all orbiting objects to determine the location of NGSO satellites.[25]

Boeing fails to explain why it would be an undue burden for NGSO licensees to perform the presumably simple task of identifying where their satellites are at any point in time. This, surely, is information they know, and with tools such as the Internet it would be a simple matter for it to be made readily accessible to affected parties.

Boeing also fails to justify forcing GSO operators and users to rely on third-party data. To the best of PanAmSat's knowledge, neither the Air Force nor NASA has an obligation to provide orbital data continuously, nor is either responsible for the accuracy of whatever data they do provide. As a result, the

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tend to be avoided due to the wide divergence of individual countries' domestic regulatory needs.

[24] PanAmSat does not propose any pre-licensing determination of compliance with the Operational Limits, as opposed to the Additional Operational Limits. See Boeing Comments at 5; Loral Comments at 5; SkyBridge Comments at 9, 16.

NGSO operators themselves are a much better source for securing this crucial information than are generalized NASA or Air Force databases.

SkyBridge's suggestion that the Commission rely on international dispute resolution mechanisms to ensure compliance with domestic requirements is similarly misguided.[26] Annex 8 of Chapter 3 of the CPM Report outlines a process that could be used by different Administrations to resolve cases of alleged NGSO interference. This process, however, is not up to the task of resolving disputes domestically between GSO operators or users, on the one hand, and domestic NGSO licensees or foreign NGSO licensees who have been granted access to the U.S. market, on the other. Unlike the ITU, the Commission can act rapidly and has the means to enforce its decisions. The Commission needs to use these powers to ensure that all disputes arising within the United States are resolved promptly and effectively. The ITU's dispute resolution process, therefore, is neither an appropriate model nor an adequate substitute for the Commission's enforcement procedures.

Moreover, SkyBridge's statement that the Commission has adequate authority to deal with "proven" non-compliance with the operational limits is disturbing.[27] As the CPM Report makes clear, violations of the Operational Limits must be resolved "as expeditiously as possible."[28] Consistent with this requirement, the Commission should not wait until a dispute has been fully resolved and non-compliance has been "proven" before requiring an NGSO operator to take corrective action.

Finally, for the reasons discussed in the previous section, the Commission should not defer to the ITU in developing a reliable means of measuring the

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[25] Boeing Comments at 7.
[26] SkyBridge Comments at 9-10.
[27] SkyBridge Comments at 16.
[28] CPM Report at § 3.1.2.4.7(iii).

actual $EPFD_{down}$ levels generated by an NGSO system into operational GSO earth stations.

V. THE AGGREGATE LIMITS

Individual limits were developed to promote regulatory certainty and to allocate burdens clearly among NGSO licensees. In the end, however, they are not what matters: the ability of GSO systems to operate co-frequency with NGSO systems will depend on the aggregate interference caused by all NGSO systems, not with any single licensee's compliance with its scaled limits.

It is crucial that the Commission maintain its focus on the issue of aggregate limits. There is a significant disconnect between the number of systems used to transform the aggregate limits into individual limits (3.5) and the number of Ku-band NGSO applications currently pending before the Commission (8). This disconnect is even more pronounced when one considers the likelihood of additional foreign systems seeking to operate in the United States. Simply stated, for the current single-system limits to have any meaning, the number of Ku-band NGSO systems cannot be allowed to go above 3.5 and the aggregate characteristics of all licensed systems cannot be allowed to deviate from the assumptions underlying the development of the single-system limits. Under these circumstances, suggestions by Boeing and SkyBridge that the Commission can ignore the problem of aggregate limits until 3 systems have been placed into operation[29] are divorced from reality and threaten the entire premise for the CPM compromise. For similar reasons, Loral's suggestion that the Commission can process the eight pending applications without first resolving the question of the aggregate limits should be rejected.[30]

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[29] Boeing Comments at 4-5; SkyBridge Comments at 22.

[30] Loral Comments at 8.

Indeed, SkyBridge goes so far as to suggest that the Commission should have no role in enforcing the aggregate limits, and that the international community instead should be responsible for seeing to it that there is compliance.[31] However, the reasons SkyBridge proffers for taking the Commission out of the equation - the difficulty of assessing compliance as different systems change their operating parameters over time, and the cumulative effects of systems licensed by different countries - actually underscore why effective Commission enforcement in the U.S. market is crucial. Without the FCC playing a role, GSO operators would be left to fend for themselves in an international regime that lacks effective enforcement tools, and in which any attempt to ensure compliance with the aggregate limits could quickly degenerate into finger-pointing among NGSO operators. This is not the intent of the CPM compromise, nor is it a reasonable outcome to the problems presented by NGSO use of GSO spectrum.

[31] SkyBridge Comments at 22 and n. 49 (contending that the aggregate limits "have no meaning for individual systems and necessarily must be governed on an international level").

Finally, the Commission should bear in mind that, as with the single-entry limits, there is no reliable means for verifying NGSO compliance with aggregate limits once NGSO systems are operational. The only effective means for keeping NGSO systems within the aggregate limits, therefore, is software simulation. The aggregate limit compliance procedure proposed by PanAmSat is simple to implement and should ensure that GSO systems are protected to the extent intended by the aggregate limits. PanAmSat agrees with DirecTV, moreover, that, if future study demonstrates that the procedure used to go from aggregate to single-entry limits must be revised, or if $N_{effective}$ changes, then the single-entry limits must be revised accordingly.

Respectfully submitted,

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ENGINEERING AFFIDAVIT

I, Philip A. Rubin, Chief Scientist of PanAmSat Corp., hereby certify that I am the technically qualified person responsible for the preparation of the technical information contained in these Reply Comments and that I am familiar with Part 25 of the Commission's Rules and Regulations. My experience is documented in many engineering filings with the Commission.

I have reviewed all technical materials provided herein and certify that they were either prepared by me or under my direction. I further certify that the technical information submitted in this amendment is complete and accurate to the best of my knowledge.

By: _____
Philip A. Rubin
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Date: 1/14/2000

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